Remarks

In the office action mailed December 15, 2005, claims 1 - 7, 10, 12, 14 and 15 were rejected under 35 U.S.C. §102(b) over U.S. Patent No. 5,991,551 (to Bacs, Jr. et al.); claim 9 was rejected under §102(b) over U.S. Patent No. 6,021,005 (to Cathey, Jr. et al.); claims 16 - 19 were rejected under 35 U.S.C. §102(b) over U.S. Patent No. 4,575,193 (to Greivenkamp, Jr.); claim 8 is rejected under 35 U.S.C. §102(e) over U.S. Patent No. 6,107,617 (to Love et al.);claim 11 is rejected under 35 U.S.C. §103(a) over Bacs Jr., et al.; claim 13 is rejected under 35 U.S.C. §102(b) over Bacs Jr. et al. in view of U.S. Patent No. 5,453,844 (to George et al.); and claim 20 is rejected under 35 U.S.C. §102(b) over Greivenkamp, Jr. in view of Love et al.

Each of independent claims 1, 12 and 14, therefore, stands rejected under §102(b) over Bacs, Jr. et al., and each of independent claims 16 and 18 stands rejected under §102(b) over Grievenkamp et al.

The office action mailed December 15, 2005 states, in part, that the Bacs, Jr. et al. reference discloses that by selectively switching liquid crystal shutters on and off, the shutter aperture is moved through a plurality of positions, and that the blurring of an image may be enhanced. The office action states that the Bacs, Jr. et al. reference discloses an imaging system that selectively blurs a portion of an image. Applicants contend, however, that the Bacs, Jr. et al. reference does not disclose such a system.

In particular, the Bacs, Jr. et al. reference is directed toward providing an autostereoscopic image and states that "[b]y virtue of the method and apparatus of the present invention, display of the two-dimensional image recordings by a conventional display apparatus ... can be perceived as a three-dimensional illusion." (Bacs, Jr. et al.,

col.2, lines 51 - 55). The reference discloses that horizontal or vertical disparity may be created by recording successive images through an aperture in an opaque element that moves relative a lens. The disparity is disclosed to be created by the change in point of view of the image from opposing locations of the aperture (Bacs, Jr. et al., col.6, lines 41 - 56). The horizontal or vertical disparity is disclosed to be responsible for adding parallax to visual images (Bacs, Jr. et al., col.6, lines 57 - 59). The reference further discloses that changes in the viewing perspective, causes changes in the appearance of the spatial relationships between objects having essentially flat surfaces. (Bacs, Jr. et al., col.59 - 64).

The Bacs, Jr. et al. reference also states that the motion of the aperture may be stopped when the camera shutter is closed in order to eliminate gaps in the image frame recordings, and that any foreground and background motion will therefore appear continuous (Bacs, Jr. et al., col.10, lines 30 - 34). The reference then states that:

> Thus, annoying strobing effect (jitter) of any foreground and background motion is avoided. Instead, enhanced blurring (relative to the continuous parallax scanning motion approach) of foreground and background motion will be achieved to more effectively mask these motion artifacts.

(Bacs, Jr. et al., col.10, lines 35 - 39). Although the reference, therefore, mentions the term "blurring" in connection with removing jitter by stopping the motion of the aperture when the camera shutter is closed, it is clear that this is not a blurring of a portion of a single image. Applicant submits that causing a blurring of a single frame (or portion thereof) in the frame recordings is not consistent with the teachings of the Bacs, Jr. et al. reference, which is to create a two dimensional image having depth and spatial relationship information.

In an embodiment shown in Figure 8, the Bacs, Jr. et al. reference discloses the use of an optical element 90 that is implemented as a "liquid crystal or ferro-electric panel (spatial light modulator)" (Bacs, Jr. et al., col.10, lines 49 - 51). The reference discloses that the element 90 includes a plurality of individually addressable cells that may be selectively rendered transparent to provide a lens aperture (Bacs, Jr. et al., col.10, lines 51 - 58).

The Bacs, Jr. et al. reference also discloses that "rather than abruptly switching the cells between transparent and opaque states, the transition may be effected somewhat gradually through progressively changing degrees of grey scale" (Bacs, Jr. et al., col. 10, line 66 - col. 11, line 2). Applicant submits, however, that such selective control of cells would not cause a blurring, but rather an intensity or shade change in the image passing through that activated cell. Even a gradual change from opaque to transparent in a cell or set of cells is not disclosed to and would not create a blurring of the image in the frame being recorded. Again, causing a blurring of a single frame (or portion thereof) in the frame recordings is not consistent with the teachings of the Bacs, Jr. et al. reference, which is to create a two dimensional image having depth and spatial relationship information. In order to achieve this, sharp contrasts and enhanced edges are generally required, not blurred image frames. Blurring, in accordance with an embodiment of the invention, is caused by redirecting a portion of light through an element to be directed through an adjacent element. There is no disclosure in the Bacs, Jr. et al. reference that achieves anything like this effect.

Claim 1 is directed to an imaging system that includes, in part, a spatial light modulator that is interposed between the image receiving unit and an input image. The

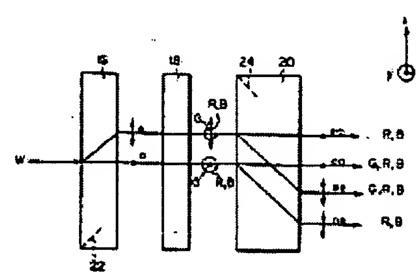
spatial light modulator is for selectively modulating the input image such that at least one portion of the input image may be blurred as it passes through the spatial light modulator toward the image receiving unit. Nothing in the Bacs, Jr. et al. reference discloses, teaches or suggests such a system. The Bacs, Jr. et al. reference includes no area of the input image that is blurred as it passes to the image receiving unit. Claim 1, therefore, is submitted to be in condition for allowance. Each of claims 2 - 11 depends directly or indirectly from claim 1 and is also submitted to be in condition for allowance.

Independent claim 12 is directed to a system that includes, in part, an array of birefringent elements through which an image field may pass, wherein the birefringent elements are each individually selectable to permit selective birefringence of an input image such that at least a portion the image field is blurred prior to reaching an image receiving unit. The optical element 90 shown in Figure 8 of Bacs, Jr. et al. does not provide that a portion the image field is blurred prior to reaching an image receiving unit. Again, the optical element 90 instead provides selective transparent, opaque, or gray scale cells wherein the transparent cells provide a lens aperture. The transition states between opaque and transparent will not blur any portion of the image frame, but rather with result in a change in brightness. Claim 12, therefore, is submitted to be in condition for allowance. Claim 13 depends directly from claim 12 and is also submitted to be in condition for allowance.

Independent claim 14 is directed to a system that includes, in part, a plurality of electrodes positioned adjacent a liquid crystal cell such that portions of the liquid crystal cell may be selected to provide birefringence of an image field such that at least a portion of the image field is blurred prior to reaching an image receiving unit. Again, the optical

element 90 shown in Figure 8 of Bacs, Jr. et al. does not provide such selective birefringence such that at least a portion of the image field received by the receiving unit is blurred. Claim 14, therefore, is submitted to be in condition for allowance. Claim 15 depends directly from claim 14 and is also submitted to be in condition for allowance.

The Greivenkamp, Jr. reference discloses an optical color dependent spatial frequency filter that includes a pair of birefringent elements that are able to change the polarization state of light between them such that the polarization of a first color is changed by a first amount, and a polarization state of a second color is changed by a second amount. The filter is disclosed to be used with a color image sensor and provides an achromatic frequency response to an input image. The filter of Greivenkamp is disclosed to include a first birefringent element 16, a wave plate 18 and a second birefringent element 20. The filter is shown in Figure 2A below



Greivenkamp, Jr., Figure 2A. The first birefringent element 16 causes incident illumination to be split into two components having mutually orthogonal polarizations (Greivenkamp, Jr. col.4, lines 16 - 24). The wave plate 18 causes the polarizations of the red and blue components of the incident illumination to become circularly polarized, but does not affect the polarization of the green components of the incident illumination (Greivenkamp, Jr. col.4, lines 27 - 33). The second birefringent element 20 deflects the light that is polarized in one linear direction (extraordinary), while passing the light that is

polarized in a second linear direction (ordinary) (Greivenkamp, Jr. col.4, lines 45 - 49).

The office action states that the above filter of Greivenkamp includes a first area (16) for reflecting the input image along a principle axis of refraction toward the image receiving unit (12), and a second area (20) for refracting the input image along the principle axis of refraction and a second axis of refraction. (Office Action mailed 12/15/2005, page 7). The office action further states that although a single light ray (W) is shown, "it is clear from the specification that the imaging system is used when a large number of light rays are incident onto the spatial light modulator". (Office Action mailed 12/15/2005, page 7).

There is no disclosure, however, of different (adjacent) input rays (W) actually being mixed together and thereby blurred. The purpose of the filter of Greivenkamp, Jr. is to spatially separate the polychromatic image into images of different frequency components (colors). The actions that result, therefore, by the element 16, wave plate 18 and element 20 act on the image as a whole to divide the image into the respective frequency components. In short, there is no blurring in Greivenkamp, Jr., only spatial filtering of colors of the image.

Independent claim 16 is directed to an imaging system that includes, in part, a spatial light modulator that includes a first area for selectively refracting the input image only along a principle axis of refraction, and a second area for selectively refracting the input image along a principle axis of refraction and along a second axis of refraction that is angularly disposed to the principle axis of refraction such that a first portion of the input image that passes through the first area of said spatial light modulator is not blurred, while a second portion of the input image that passes through the second area of said

spatial light modulator is blurred.

The Greivenkamp, Jr. reference discloses a first birefringent element 16 and a second birefringent element 20. These elements, however, each act on the whole image (i.e., are in series). The elements 16 and 20 do not act on respective portions of the image (e.g., by dividing the image) to separate the image into blurred and non-blurred areas as claimed in claim 16. The subject matter of claim 16, therefore, is not disclosed in the Greivenkamp, Jr. reference. Claim 16, therefore, is submitted to be in condition for allowance. Claim 17 depends from claim 16 and is also submitted to be in condition for allowance.

Independent claim 18 is also directed to a system that includes, in part, a spatial light modulator that includes a first area for selectively refracting the input image along a first axis of refraction and a second axis of refraction, and a second area for selectively refracting the input image along the first axis of refraction and along a third axis of refraction such that a first portion of the input image that passes through the first area of the spatial light modulator is slightly blurred, while a second portion of the input image that passes through the second area of the spatial light modulator more blurred than the first portion of the input image. The Greivenkamp, Jr. reference does not disclose such a spatial light modulator. The subject matter of claim 18, therefore, is not disclosed in the Greivenkamp, Jr. reference. Claim 18, therefore, is submitted to be in condition for allowance. Claims 19 and 20 depend from claim 18 and are also submitted to be in condition for allowance.

Each of claims 1 - 20 therefore, is respectfully submitted to be in condition for allowance. Favorable action consistent with the above is respectfully requested

Respectfully submitted,

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